



BUILDING TECHNOLOGY LECTURERS' INTEGRATION OF NATIONAL BUILDING CODE PROVISIONS INTO CLASSROOM INSTRUCTION FOR SAFETY AND SUSTAINABLE HOUSING IN SOKOTO STATE, NIGERIA

SALE, N. K., Ph.D AND TIJJANI, SALISU LADAN

Woodwork Unit, School of Vocational and Technical Education, Federal College of Education, Gidan Madi, Sokoto State.

*Corresponding author: salenimrodkamo@fcegmm.edu.ng

ABSTRACT

The study examined the extent to which Building Technology lecturers in Sokoto State integrate National Building Code (NBC) provisions into classroom instruction for safety and sustainable housing. A descriptive survey design was adopted. The population consisted of 35 Building Technology lecturers from Colleges of Education and Technical Colleges in Sokoto State, all of whom were studied. Data were collected using the Building Technology Lecturers' Integration of National Building Code Provisions Questionnaire (BTLINBCPQ), a structured instrument that was validated by experts and yielded a reliability coefficient of 0.80 using the Cronbach Alpha method. Data were analyzed using mean, standard deviation, and t-test statistics at a 0.05 level of significance. Findings revealed that lecturers gave insufficient attention to practical fire safety measures, detailed material specifications, and comprehensive accessibility standards. The t-test result revealed a significant difference between urban and rural lecturers in the integration of fire safety standards. The study concluded that without deliberate pedagogical improvements, graduates may lack the competence required to apply NBC standards effectively in professional practice. It recommended regular practical training, enhanced specification-writing skills, and continuous professional development opportunities for lecturers to strengthen the integration of NBC provisions into Building Technology instruction.

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INTRODUCTION

Building codes are regulations that establish minimum standards for the design, construction, and maintenance of buildings to ensure structural balance, occupant safety, and environmentally sustainable development. According to Amasuomo, (2021), building codes provide uniform guidelines that all building projects in the country must adhere to, promoting consistency and safety in the built environment. Okwuosa, Basil, & Ezema (2025), noted that the Nigerian building code; specifies structural, fire, and health requirements tailored to local conditions. In particular, fire safety standards within the code, ensure that buildings incorporate preventive measures, detection systems, and safe evacuation routes to protect lives during emergencies. Additionally, Ichendu Ejike & Irimiagha (2024) emphasized that

building codes are essential for reducing construction failures and boosting public confidence in the housing sector. In addition, these perspectives highlight that building codes serve as both technical and policy tool that protects lives, safeguards investments, and encourages sustainable development. Hence, building codes provide the regulatory framework that shapes the quality, safety, and functionality of the built environment, ensuring that all physical structures meet established standards for human use and environmental safety sustainability.

The fire safety requirements in building codes, provide regulatory framework to prevent, identify, and manage fire hazards in the constructed environment. According to Oaikhena & Akande (2024), fire safety requirements include the use of fire-resistant materials, the implementation of fire detection and alarm systems, fire escapes, and distances between buildings. The importance of local fire safety requirements was also emphasized by Falola, Agbola, & Alabi (2024) in relation to Nigerian fire safety, given that the country is characterized by growing urbanization and unregulated construction methods that contribute to fire danger. Moreover, the effective enforcement of fire safety requirements was supported by Adeleye (2020) since it helps to avoid loss of life, minimize economic losses, and improve citizens' confidence in constructed environment elements. Notwithstanding different emphases, it is clear that fire safety requirements are essential elements in building codes, ensuring, through fire safety, the constructed environment is secure for human life and properties. The specifications of materials used in construction are clearly defined in building codes, ensuring that the quality, durability, and applicability of construction materials can support structural integrity and functionality. According to Opawole, Alao, Yusuf, Adu, & Ofoetan (2022)

The National Building Code in Nigeria has specific requirements for the specification, testing, and certification of construction materials such as cement, steel, timber, and aggregate. Not adhering to specifications, according to Ichendu, Ejike, & Irimiagha (2024) leads to early structural failures, increases construction maintenance costs, and impacts construction quality. However, it is important to note that the use of low-standard construction materials has resulted in regular collapses in buildings in the Nigerian context. Additionally, Udodiugwu, Obiakor, Eneremadu, Onwuegbuchulem, & Anyaegbunam (2025) argues that the importance of construction material specifications also impacts positively on construction sustainability by encouraging the use of construction materials that are environmentally and structurally sound. This discussion has clearly demonstrated that construction material specifications are important for enabling buildings to not only provide safe structures, buildings also need to remain functional and economical through their life cycle.

Accessibility requirements in building standards, guarantee that the environment around us is

inclusive for people's use, irrespective of whether it is for people with disabilities, the aged, or other people for that matter. According to Unuebho & Adeola (2025) guidelines, in the National Building Code in Nigerian law requires barrier-free entrance, ramps, elevators, disabled toilets, and signs for buildings. Ikudayisi & Taiwo (2022) agreed that it increases social equity by ensuring universal access to basic services and spaces. This aligns well with the United Nations Convention on the Rights of Persons with Disabilities, to which Nigeria also signed (Chibaya, Chichaya, Govender, & Naidoo, 2022). According to Apostolidou & Fokaides (2023) accessibility enhances compliance and thereby meets regulatory requirements, it also enhances user benefit, increases building value, and helps integrate people from different abilities. This line of thought, supports that accessibility in building standards plays a crucial role in ensuring that buildings are inclusive, functional, and beneficial to people's lives.

The constructed environment relates to a broad range of human constructions that support different human endeavors, such as residential construction, transportation, public spaces, and services. According to Ojobo, Oluwagbemiga, & Shamang (2024), constructed environments refer to the setting that largely affects people's lives, productivity, and well-being. This perspective particularly emphasizes the symbiotic relationship that exists between infrastructure and quality of life. Additionally, Agboola, Alotaibi, Dodo, Abuhussain, & Abuhussain (2024) agreed that the quality of constructed environments has a clear relationship with economic and health factors, hence making it relate to larger goals for growth. Ogunkan, (2022) added that, by the assertions obtained by the Federal Ministry of Works and Housing, a well-designed constructed environment will integrate cultures, support environmental conservation, and perform according to regulatory requirements. The different perspectives on constructed environments attempt to establish it as a setting for the construction code, ensuring that human being are save. Safety refers to the condition of being secured from risk, hazard, or harm throughout the processes of construction and the eventual occupants of buildings.

The construction safety, in the view of Umeokafor, Okoro, Diugwu, & Umar (2023), is the means for avoiding accidents and safeguarding the lives of both building workers and building users. In this sense, safety is a working element in building construction management. As enshrined in the National Building Code of Nigeria (NBC, 2018), safety regulations in building design are established to act as a countervailing measure against fires, building collapses, and health hazards, highlighting the regulatory systems' importance in averting impending disasters. Moreover, Sunday & Onosemuode (2025) reiterated that safety could never be regarded as one-off but, rather, as an ongoing process involving recurrent risk assessment and maintenance. Together, these observations clarify safety as an ongoing, rule-based commitment critical to securing the functionality, reliability and longevity of the build srructures.

Sustainable housing refers to a process of building residential structures that sustain the needs of the existing generation without impairing the next generation's capability to meet their own needs while minimizing environmental impact. Akinwande & Hui (2024) clarify that sustainable housing involves affordability, durability, and environmentally friendly construction, with a focus on adopting a holistic housing supply approach. Ukpai & Barnaby (2023) pointed out that in Nigeria, sustainable housing must adhere to building codes that address energy efficiency, waste management, and climate change mitigation. This draws attention to the connection between policy compliance and environmental effect. Adeyemi, Ohakawa, Okwandu, Iwuanyanwu, & Ifechukwu (2024) emphasized the necessity of adapting housing design to the climatic conditions of the area, culture, and availability of materials. These viewpoints illustrate that it is only through collaborative action of technical innovation, policy adherence, and responsiveness of communities to achieve sustainable housing.

For Sokoto State lecturers of Building Technology, their mandate is to equip students with the technical, legal, and ethical competencies to practice building codes, built environment principles, safety practices, and sustainability measures in real construction contexts. Technical education programs, based on Igberaharha (2021), must yield graduates who can translate regulatory obligations into efficacious practice and pedagogy. This highlights the requirement for lecturers to incorporate building codes and safety principles into their pedagogical practice. This highlights the manner in which pedagogy reinforces students' ability to apply theory in practice. Once more, Oladele (2024) found that building technology training significantly increases graduates' readiness for industry jobs where lecturers incorporate practical ability with current regulation knowledge. Lecturers of Building Technology serve critical intermediary functions between practice and policy because they have the responsibility of educating future construction professionals with the skills and competencies they need to apply fire safety regulations, material specifications, and accessibility features provided in the National Building Code. It is theirs to ensure graduates apply regulatory specifications into safe, functional, and sustainable building practice. However, evidence on the extent to which Building Technology lecturers integrate these provisions into classroom instruction in Sokoto State remains limited, thereby raising concerns about students' preparedness to apply National Building Code requirements in professional practice.

STATEMENT OF THE PROBLEM

Building Technology lecturers play a critical role in equipping students with the knowledge and skills required to apply National Building Code provisions relating to fire safety, material specifications, and accessibility standards in construction practice. These provisions are essential for promoting safety, functionality, accessibility, and sustainability in the built

environment. Ideally, lecturers should integrate these building code provisions into classroom instruction through competency-based and practical training. This would enable graduates to translate regulatory requirements into safe, sustainable, and quality construction practices.

However, there is limited empirical evidence on the extent to which Building Technology lecturers integrate fire safety requirements, material specifications, and accessibility standards of the National Building Code into classroom instruction. This creates uncertainty regarding the alignment between policy requirements and instructional practice. The gap between policy provisions and classroom instruction may produce graduates who are familiar with building regulations but lack the practical competence to apply them effectively in real construction settings. This could undermine efforts to promote safety, accessibility, and sustainable housing. Therefore, this study investigated the extent to which Building Technology lecturers in Sokoto State integrate National Building Code provisions into classroom instruction with a view to providing evidence for improving teaching practice and bridging the gap between policy and practice.

OBJECTIVES OF THE STUDY

The study sought to work on the following objectives:

1. To determine the extent to which Building Technology lecturers integrate fire safety standards from the National Building Code on into classroom instruction for Safety and Sustainable Housing.
2. To examine the extent to which Building Technology lecturers integrate material specifications from the National Building Code into classroom instruction for Safety and Sustainable Housing.
3. To assess the extent to which Building Technology lecturers integrate accessibility provisions from the National Building Code into classroom instruction for Safety and Sustainable Housing.

RESEARCH QUESTIONS

The following research questions guided the study:

1. To what extent do Building Technology lecturers in Sokoto State integrate fire safety standards from the National Building Code into classroom instruction for safety and sustainable housing?
2. What is the extent to which Building Technology lecturers integrate material specifications from the National Building Code into classroom instruction for safety and sustainable housing?

3. What is the extent to which Building Technology lecturers integrate accessibility provisions from the National Building Code into classroom instruction for safety and sustainable housing?

HYPOTHESIS

1. There is no significant difference between Urban and Rural Building Technology lecturers on the extent to which they integrate fire safety standards from the National Building Code into classroom instruction.

METHODOLOGY

The descriptive survey research design was used in the study. This is appropriate as it provided facts from the respondents on the extent to which they taught, included, and integrated National Building Code provisions in classroom teaching on aspects of the built environment. The geographical area covered by this study was Sokoto State, Nigeria. The population consisted of only 35 lecturers and all were studied. Lecturers who taught Building Codes, Construction Technology, or similar courses were selected using census sampling. The study used a structured questionnaire developed by the researchers titled “Building Technology Lecturers’ Integration of National Building Code Provisions Questionnaire” (BTLINBCPQ). The questionnaire contained 24 items arranged in four sections. Section A captured the demographic information of the respondents. Section B had 8 items on providing fire safety standards. Section C consisted of 8 items on incorporating material specifications, while Section D contained 8 items on incorporating accessibility provisions. All the items of Sections B–D were rated on a five-point Likert scale ranging from Very Low Extent (1) to Very High Extent (5). Three experts, two in Building Technology Education and one Measurement and Evaluation, carried out face validation of the instrument. Pilot testing was conducted on lecturers of Building Technology in Colleges of Education (Technical), Gusau, Zamfara State. Pilot test data were subjected to reliability testing using the Cronbach Alpha method, which yielded a reliability coefficient of 0.80. The researchers administered the questionnaire to the respondents at their institutions to ensure a high rate of retrieval. Mean and standard deviation were used to answer the research questions in accordance with the cut-off point of 2.50. The t-test was used to test the null hypothesis at 0.05 significance level.

RESULTS

The findings of the study are presented below:

Research Question One: To what extent do Building Technology lecturers in Sokoto State teach fire safety standards from the National Building Code in relation to the building codes on different aspects of the built environment for Safety and Sustainable Housing in Sokoto

State?

Table 1: Mean Ratings on the Integration of NBC Material Specifications in Teaching and Learning of Building Technology

S/N	Item Statement	Mean	S.D	Remarks
1	I explain NBC fire safety requirements for residential buildings to my students.	3.71	1.23	Agreed
2	I teach students the NBC provisions for fire-resistant materials in construction.	3.14	1.22	Agreed
3	I include NBC guidelines on fire escape routes in my classroom instruction.	2.31	1.18	Disagreed
4	I teach students NBC requirements for emergency lighting and signage.	2.34	1.24	Disagreed
5	I demonstrate NBC-recommended spacing and location of fire extinguishers.	2.86	1.57	Agreed
6	I incorporate NBC fire safety requirements into lesson plans for Building Construction.	2.83	1.50	Agreed
7	I give assignments or projects based on NBC fire safety provisions.	3.06	1.19	Agreed
8	I discuss NBC fire safety standards during practical site visits or fieldwork.	3.03	1.32	Agreed
Grand Mean 2.91; Cut-off Mean 2.50; Decision Agreed (Moderate Extent).				

Table 1 showed that questionnaire items 1, 2, 7, and 8 were accepted or agreed upon as positive responses because they have mean values above the decision mean value of 2.50. This indicates that the respondents (Building Technology lecturers) agreed that these items reflect their integration of NBC fire safety requirements in teaching and learning. However, items 3 and 4 were rejected or disagreed with because their mean values fell below the decision mean value of 2.50, suggesting that these aspects of NBC fire safety requirements were less frequently integrated into instructional practice.

Research Question Two: What is the extent to which Building Technology lecturers integrate material specifications from the National Building Code into classroom instruction for safety and sustainable housing?

Table 2: Mean Ratings on the Integration of NBC Material Specifications in Teaching and Learning of Building Technology

S/N	Item	Mean	S.D	Remarks
1	I teach NBC-specified standards for cement quality in building projects.	3.11	1.32	Agreed
2	I explain NBC material requirements for concrete mix ratios to my students.	3.03	1.25	Agreed
3	I teach NBC specifications for structural steel in building works.	3.03	1.48	Agreed
4	I incorporate NBC requirements for timber quality into lesson plans.	4.03	1.04	Agreed
5	I teach NBC standards for roofing sheet gauge and quality.	3.43	1.38	Agreed
6	I guide students on NBC-approved wall finishes and cladding materials.	2.63	1.44	Agreed
7	I teach NBC specifications for plumbing materials and fittings.	2.66	1.47	Agreed
8	I use NBC material standards in classroom examples and practical exercises.	2.57	1.31	Agreed
Grand Mean 3.06; Cut-off Mean 2.50; Decision Agreed (Moderate Extent)				

Table 2 showed that all the items were agreed upon because their mean values were above the decision mean value of 2.50, indicating that the respondents integrate NBC material specifications into teaching and learning to varying extents.

Research Question Three: What is the extent to which Building Technology lecturers integrate accessibility provisions from the National Building Code into classroom instruction for safety and sustainable housing?

Table 3: Mean Ratings on the Integration of NBC Accessibility Provisions in Teaching and Learning of Building Technology

S/N	Item	Mean	S.D	Remarks
1	I teach NBC requirements for wheelchair-accessible entrances in buildings.	2.37	1.31	Disagreed
2	I include NBC guidelines on ramp design in my instruction.	2.20	1.51	Disagreed
3	I teach NBC provisions for accessible toilets in public buildings.	2.57	1.17	Agreed
4	I explain NBC requirements for corridor and doorway widths to ensure accessibility.	2.63	1.26	Agreed
5	I teach NBC standards for signage for persons with disabilities.	2.49	1.48	Disagreed
6	I integrate NBC accessibility provisions into design projects	3.94	0.94	Agreed

S/N Item		Mean	S.D	Remarks
	for students.			
7	I discuss NBC accessibility standards during construction site visits.	3.94	1.00	Agreed
8	I evaluate students' work based on compliance with NBC accessibility guidelines.	4.00	1.03	Agreed
Grand Mean = 2.89; Cut-off Mean = 2.50; Decision = Agreed (Moderate Extent)				

Table 3 shows that questionnaire items 3, 4, 6, 7, and 8 were agreed upon because their mean values were above the decision mean value of 2.50. However, 1, 2, and 3 were disagreed with because their mean values because their mean values were below the decision mean value of 2.50.

HYPOTHESIS TESTING

There is no significant difference between Urban and Rural Building Technology lecturers on the extent to which they integrate fire safety standards from the National Building Code into classroom instruction.

Table 4: Independent t-test of Mean Ratings of Responses of Urban and Rural Building Technology Lecturers in Sokoto State on the Extent to which they Teach Fire Safety Standards from the National Building Code

Variable	N	Mean	SD	Df	t	p-value	Decision
Urban	14	3.07	0.45	33	2.68	0.012	Significant
Rural	21	2.64	0.46				

Table 4 shows that the total P-value is 0.012, which is less than 0.05. This implies that there is a significant difference in the mean ratings of responses of urban and rural Building Technology lecturers in Sokoto State regarding the extent to which they teach fire safety standards from the National Building Code. Therefore, the null hypothesis (H_0) which states that there is no significant difference was rejected.

DISCUSSION

The findings on Research Question One indicate areas including means of escape in the event of fire, emergency lighting and signs, spatial and positioning of fire extinguishers, and their inclusion in lesson plans were less frequently addressed. These findings are in line with the overall problem of fire safety education in Nigeria. For instance, Zul, Sulaiman, Mokhtar, Suhaimi Fauzan, and Rani (2024) agreed with the findings of this research that there is very little fire safety procedure knowledge among students in higher learning institutions, primarily due to the lack of focus on fire drills and hazard consciousness during their training.

Similarly, Daramola, Bakare, and Owabumowa (2024) emphasized that theoretical knowledge alone is insufficient and that routine training and the upkeep of fire safety equipment are essential to efficient fire safety. The findings also corroborate Adeleye (2020), who reported that inadequate awareness and implementation of fire safety practices in public buildings increase vulnerability to fire disasters. Furthermore, Oaikhen and Akande (2024) observed that fire safety compliance remains weak in many Nigerian buildings because practical fire protection measures are often neglected despite the existence of regulations.

The findings on material specifications attracted the attention of lecturers who collectively emphasize the importance of standards on cement quality, proportion of concrete mix, structural steel, timber quality, and roofing material. These findings support the study of Alugbue, Otuonuyo, Adewumi, Onamade, and Asaju (2024), which noted that specification writing within the Nigerian construction sector is often lackadaisical in detail and consistency of communication. Hence, the review of the teaching approach for all NBC specifications is important so as to create a wider understanding among would-be professionals in the industry. The findings further agree with Opawole, Alao, Yusuf, Adu, and Ofoetan (2022), who found that compliance with material standards is critical to ensuring quality construction and preventing structural defects. Likewise, Ichendu, Ejike, and Irimiagha (2024) maintained that the use of substandard materials remains one of the major causes of building failures in Nigeria. Their study emphasized the importance of educating future construction professionals on proper material selection and specification. Furthermore, Udodiugwu, Obiakor, Eneremadu, Onwuegbuchulem, and Anyaegbunam (2025) reported that adherence to approved material standards contributes significantly to environmental sustainability and long-term building performance. The findings of the present study therefore suggest that although lecturers emphasize major material specifications, there is still inadequate attention to practical application through classroom examples and exercises, which may limit students' ability to apply NBC standards in real construction situations.

The findings on accessibility provisions revealed that Building Technology lecturers integrate accessibility considerations into design projects, site visits, and student assessment, although specific accessibility requirements receive less instructional attention. The findings are consistent with Ikudayisi and Taiwo (2022), who reported that accessibility provisions are often inadequately implemented in public spaces despite the existence of policy frameworks. Similarly, Unuebho and Adeola (2025) found that many public facilities in Nigeria do not adequately provide ramps, accessible toilets, and other features required for persons with disabilities. The findings also support Chibaya, Chichaya, Govender, and Naidoo (2022), who observed that the implementation of disability-inclusive policies across many African countries remains weak despite commitments to international conventions. Furthermore, Apostolidou and Fokaides (2023) argued that accessibility standards not only enhance inclusiveness but also improve building functionality and user satisfaction. Therefore, the

findings of this study suggest that while lecturers appreciate the importance of accessibility and assess students on compliance, insufficient attention is given to the teaching of specific accessibility requirements contained in the NBC.

CONCLUSION

This study discovered that Sokoto State's lecturers in Building Technology only partly include National Building Code (NBC) provisions in teaching. Although components such as fire-resistant materials, cement quality, and incorporation of accessibility into design projects are well addressed, several critical aspects are understated. Practical fire safety techniques (escape corridors, drills, equipment orientation), elaborate NBC-prescribed material information, and core provisions for accessibility for impaired people are poorly addressed. The findings reflect a broader national issue in which awareness of building codes exists, but their consistent integration into hands-on instructional practice remains limited. With no conscious attempts to improve methods of instruction, graduates may be part of the construction industry with the theoretical but not sufficient competence to apply NBC standards into action in real building design, safety, and accessibility conditions.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations have been offered:

1. Lecturers should incorporate regular simulations, demonstrations, and drills into the curriculum to reinforce fire escape planning, emergency lighting, and fire equipment placement in compliance with NBC provisions.
2. Institutions should provide workshops on detailed specification writing, focusing on clarity, consistency, and compliance with NBC standards.
3. Building Technology lecturers should engage in NBC compliance and construction safety workshops to remain current with code updates and best teaching practices.

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